

CASE REPORT

Discrete Hypoechoic Ring in Hepatic Cavernous Hemangioma Resembling a Malignant Tumor: Correlation with Histologic Features

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Differential diagnoses of hepatic nodules include hepatocellular carcinoma, focal nodular hyperplasia, hepatic adenoma, regenerative nodule, focal fatty changes, and hemangioma. However, differentiation of these nodules can often be difficult. Hemangiomas are frequently encountered during ultrasonogram incidentally and can be diagnosed easily because they have an almost distinctive sonographic appearance: a homogeneous hyperechogenicity and discrete posterior acoustic enhancement. They also sometimes have atypical findings, for example an internal echogenicity including hypoechoogenicity, heterogeneous echogenicity, hyperechoic rim, central hypoechoogenicity due to various changes (e.g., internal hemorrhage, necrosis, thrombosis, myxomatous change, and fibrosis), and (rarely) calcification. We report herein the case of an atypical hemangioma presenting with a hypoechoic peripheral ring, mimicking a hepatic malignancy. To our knowledge, there have been no other reports demonstrating a cavernous hemangioma with a discrete hypoechoic ring and without a pseudocapsule. (*Gut and Liver* 2009;3:226-230)

Key Words: Hemangioma; Hypoechoic ring; Hepatic malignancy; Ultrasonography

INTRODUCTION

Hemangiomas are the most common benign tumor of the liver, and are frequently encountered during ultrasonogram incidentally. The incidence of hemangioma in the general population varies in published reports from 0.4% to 20%.¹ The vast majority of cavernous hemangiomas are

asymptomatic and required no treatment. The typical hemangiomas have a distinctive sonographic appearance, consisted of the demonstration of a homogenous hyperechogenicity and discrete posterior acoustic enhancement.² Atypical hemangiomas may have an internal echogenicity including hypoechoogenicity, heterogeneous echogenicity, hyperechoic rim, central hypoechoogenicity due to the various changes including internal hemorrhage, necrosis, thrombosis, myxomatous change, fibrosis and rarely calcification.³⁻¹⁰ Fatty infiltration of the liver may cause obscuration of the echogenic border around the tumor and lead to an atypical echo-poor appearance.^{3,4} Takayasu *et al.*,¹¹ who reported that the findings of a peripheral hypoechoic ring surrounding a hemangioma was a pseudocapsule made up of fibrous tissue. To our knowledge, there have been no reports demonstrating cavernous hemangioma with discrete hypoechoic ring without pseudocapsule. Here, we report the case of an atypical hemangioma presenting hypoechoic peripheral ring mimicking hepatic malignancy.

CASE REPORT

A 69-year-old man was referred to our hospital because of an incidentally detected hepatic tumors on US. On admission, liver function test were normal. Serum levels of carcinoembryonic antigen, alpha-fetoprotein, and PIVKA-II were all within normal ranges. Hepatitis B surface antigen and hepatitis C antibody were negative. Ultrasonogram was performed with a Sequoia (Acuson, Mountain view, CA, USA) using a 1-4 MHz transducer. Ultrasonogram re-

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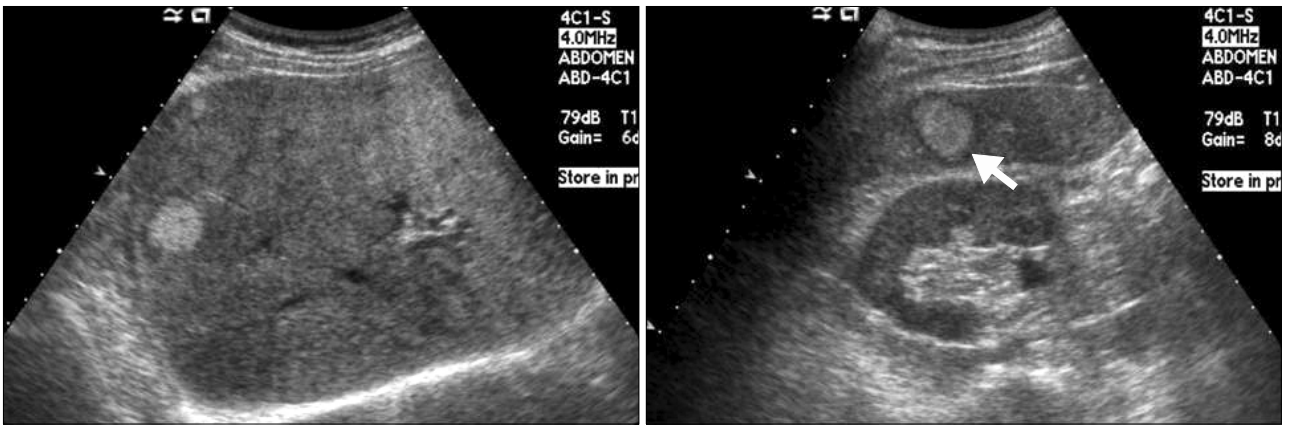


Fig. 1. Transabdominal ultrasonogram showing well-defined, homogeneous hyperechoic masses in the right lobe of the liver. A thin, discrete, hypoechoic rim can be seen around the tumor (arrow). Note the fatty infiltration in the surrounding liver parenchyma.

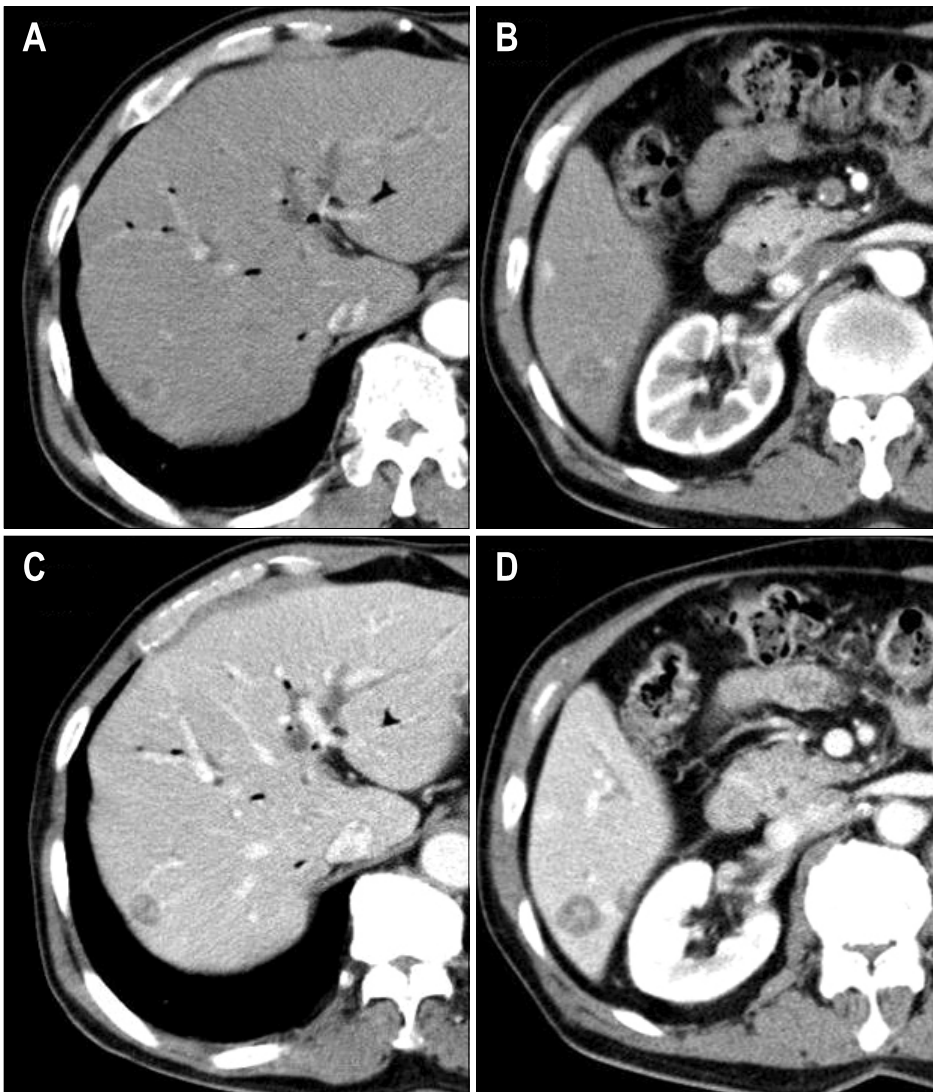


Fig. 2. (A, B) Arterial-phase CT scans showing minimal or no tumor enhancement, but peritumoral enhancement. (C, D) Portal-phase CT scans showing minimal or no tumor enhancement, but decreased peritumoral enhancement.

veals 1 to 2 cm sized, hyperechoic masses with a peripheral hypoechoic haloes and diffuse increased hepatic parenchymal echogenicity, suggesting fatty change of liver (Fig. 1). CT was performed with a Somatom Sensation 16 (Siemens, Erlange, Germany). The scanning parameters included a 0.5 second gantry rotation speed, 120 kVP, 120 mAs, 5 mm reconstructed section width at an interval of 5 mm. The patient received 120 mL of non-ionic contrast material (Ultravist 300; Shering AG, Berlin, Germany) through an 18 gauge plastic intravenous needle placed in an antecubital vein, using an automatic power injector at a rate of 3 mL/sec. Images were obtained with a scanning delay of 25 seconds for hepatic arterial phase and 65 seconds for the portal phase after contrast administration. On contrast enhanced computed tomography (CT) scan, the arterial phased CT scan showed minimal or no tumor enhancement but peritumoral enhancement. The portal phased CT scan also showed minimal or no tumor enhancement, appearing hypoattenuating mass relative to the normal liver parenchyme, but decreased peri-

tumoral enhancement (Fig. 2).

MRI was performed with a superconducting 1.5-T scanner (Signa Excite, GE Healthcare, Milwaukee, WI, USA) by using a phased-array surface coil for signal reception. MR images were obtained in the axial & coronal plane. The section thickness was 8 mm with a 2-mm interslice gap for all T2-weighted sequences. The protocol consisted of a conventional respiratory-triggered fat-suppressed FSE sequence (TR/effective TE, 10,109/84; echo-train length, 8; receiver bandwidth, 16 kHz; matrix, 256×256; number of excitations, 2; field of view, 34×26 cm) and a breath-hold fat-suppressed fast-recovery FSE sequence (TR/TE, 2,000/93; echo-train length, 16; receiver bandwidth, 10.4 kHz; matrix, 256×265; field of view, 34×26 cm; number of excitations, 2; acquisition time, 20-24 sec). Before each T2-weighted sequence, manual shimming was performed and frequency-selective fat suppression was applied. Subsequently, T1-weighted FSE and dynamic gadolinium-enhanced gradient-recalled echo imaging was performed. The tumor was low intensity on T1-weighted magnetic

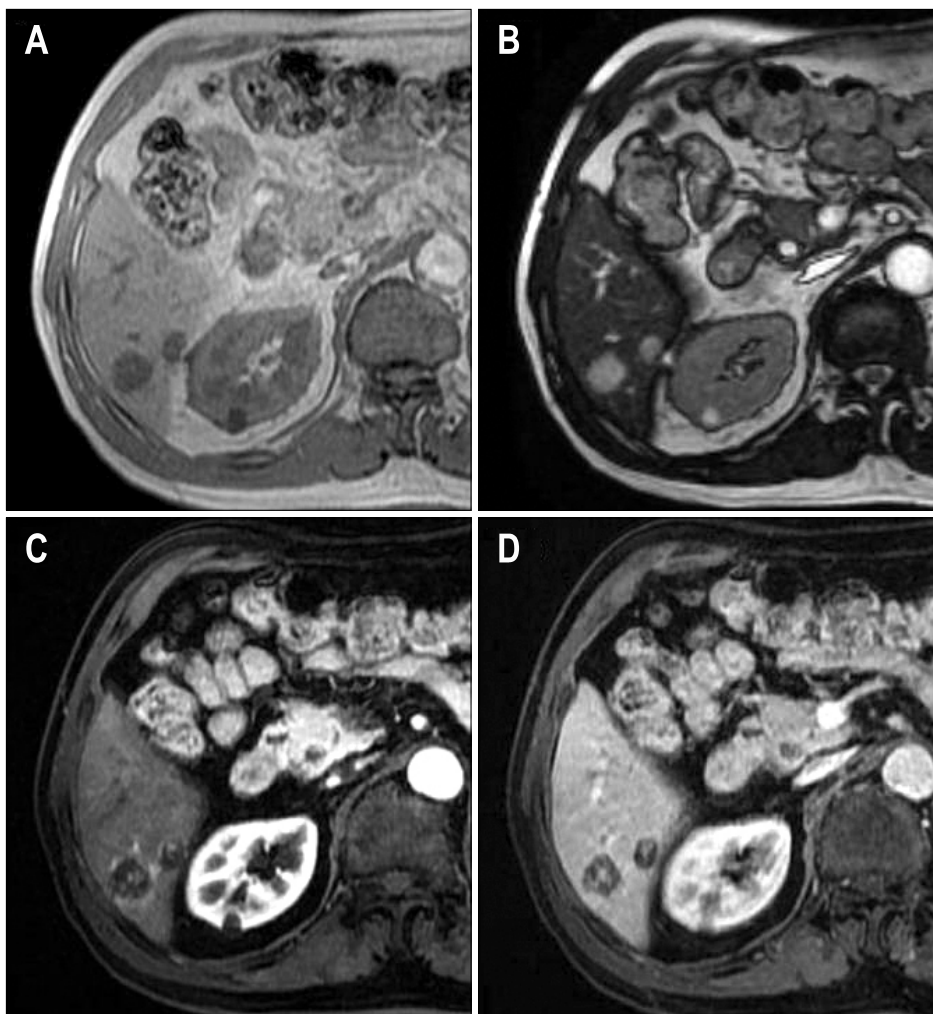


Fig. 3. (A) T1-weighted images show hypointense mass in right lobe of liver. (B) T2-weighted MR images show moderate high signal intensity of the mass. (C) Dynamic T1-weighted images during hepatic arterial phase after gadolinium administration show minimal tumor enhancement but ill-defined peritumoral enhancement. (D) Portal phased dynamic T1-weighted images show minimal tumoral enhancement and decreased peritumoral enhancement.

resonance (MR) images, and was moderately hyperintense on T2-weighted images (Fig. 3A, B). Gadolinium enhanced MR images showed same enhancement pattern as contrast enhance CT scans (Fig. 3C, D).

Since we could not rule out the possibility of malignant tumor such as metastasis based on these radiologic findings, ultrasono-guided biopsy was done.

Histologically, there were widely dilated nonanastomotic vascular spaces lined by flat endothelial cells and supported by fibrous tissue (Fig. 4A, B). The marginal zone of tumor showed relatively small vascular spaces with abundant fibrous tissue and no definitive capsular structure and fibrotic lesion were observed. The macro and microvesicular steatosis was noted in neighboring hepatocytes (Fig. 4A, C). Between hemangioma and steatosis, band like hepatocyte parenchyme was occupied.

In the present case, contrast enhanced CT scan after contrast agent administration shows mass with peritumoral enhancement suggesting AP shunt, histologically there was no definite pseudocapsule or fibrosis between tumor and parenchyme, so we guess the thin hypoechoic halo of the mass means fat spared zone by arteriportal shunting.

DISCUSSION

The great advances in radiologic imaging of the last two decades have focused attention on hepatic nodular lesions.¹² Differential diagnosis of hepatic nodules include hepatocellular carcinoma, focal nodular hyperplasia, hep-

atic adenoma, regenerative nodule, focal fatty change, and hemangioma. But, differentiation of these nodules can often be difficult.

Hemangiomas are not thought to be neoplasm, but rather than a congenital abnormality, consisting of networks of blood filled sinuses lined by endothelial cells, with abrupt demarcation from normal liver parenchyme but without a capsule.¹³ This accounts for the classic sonographic appearance. The classic hemangiomas have a distinctive sonographic appearance, consisted of the demonstration of a homogenous hyperechogenicity and discrete posterior acoustic enhancement.² Hemangiomas may undergo degeneration and fibrous replacement and this would explain the atypical appearance including hypoechogenicity, heterogenous echogenicity, hyperechoic rim, central hypoechogenicity.³⁻¹⁰ The most suggestive sonographic feature of atypical hemangioma is an echogenic border, seen as a thick echogenic rind or thin rim around the tumor.³ There are few reports describing cavernous hemangioma with hypoechoic indistinct rim.^{11,14}

However, to our knowledge, the sonographic appearance of hemangiomas with discrete hypoechoic ring has not been reported. This unusual finding often makes subsequent CT or MR imaging necessary. Hemangiomas in fatty liver could produce a peculiar halo on CT or MR imaging as well, but in most cases accurate diagnosis can be made without difficulty because of the characteristic dynamic enhancement pattern of hemangiomas.¹⁴

But in this case, there was no centripetal enhancement in tumor due to AP shunt, so further evaluation such as

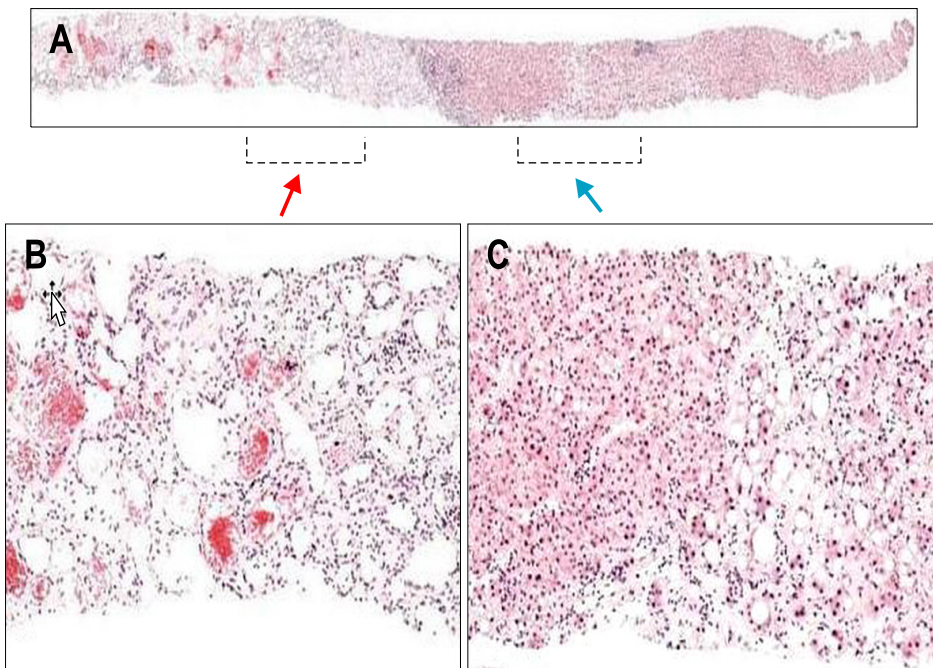


Fig. 4. Microscopic findings of liver needle biopsy (H&E stain, A, ×2; B and C, ×100). There is a well circumscribed hemangioma without fibrous capsule in liver (A). Higher magnification of hemangioma is shown in (B) directed with red arrow. Periphery of the hemangioma is occupied with spared zone of liver parenchyme, continuing steatosis, shown in (C) directed with blue arrow.

MRI was needed. There was a 1 to 2 cm sized, hypoechoic masses with a peripheral thin halo on ultrasonogram, which resemble a metastatic masses. The halo was revealed to be a fat spared area, compared with radiologic findings and pathohistologic findings through the biopsy. Histologically the tumor has abundant hyalinized tissue in the mass, the tumors exhibited minimal or no enhancement on arterial and portal phase on CT & MRI scans.

We were interested in the observation of hypoechoic rim developed in hemangioma that resembled a metastasis. Our findings are contrary to those of Takayasu *et al.*,¹¹ who reported that the findings of a peripheral hypoechoic ring surround a hemangioma was a pseudocapsule made up of fibrous tissue and the development of pseudocapsule maybe related to the cirrhotic changes in the adjacent liver parenchyma.

We think the sonographic findings of a cavernous hemangioma with a peripheral hypoechoic ring are extremely rare and are likely to remain difficult to differentiate with metastasis or hepatocellular carcinoma.

In conclusion, despite the fact that the hypoechoic ring mostly represents a malignant tumor in the liver, it can be seen in hemangioma by a fat spared zone not only by fibrosis. We guess peritumoral fat sparing can be possible by peritumoral arteriportal shunting in fatty infiltrated liver.

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